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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/510,941	10/08/2004	Jens Tonne Andersen	10297.204-US	1508

25908 7590 09/25/2007

NOVOZYMES NORTH AMERICA, INC.
500 FIFTH AVENUE
SUITE 1600
NEW YORK, NY 10110

EXAMINER	
ROBINSON, HOPE A	

ART UNIT	PAPER NUMBER
1652	

MAIL DATE	DELIVERY MODE
09/25/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/510,941	ANDERSEN ET AL.	
	Examiner	Art Unit	
	Hope A. Robinson	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *41-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *41-62* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/22/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☒ Other: *Notice to Comply*.

DETAILED ACTION

Application Status

1. Applicant's response to the Office Action mailed July 28, 2006, on January 22, 2007 is acknowledged.

Claim Disposition

2. Claims 41-62 are pending and are under examination.

3. The following objections and rejections are or remain applicable.

Sequence Compliance

4. This application contains sequence disclosures that are encompassed by the definitions for nucleotide and/or amino acid sequences set forth in 37 CFR 1.821(a)(1) and (a)(2). However, this application fails to comply with the requirements of 37 CFR1.821 through 1.825; applicant's attention is directed to the final rule making notice published at 55 FR 18230 (May 1, 1990), and 1114 OG 29 (May 15, 1990). To be in compliance, applicant is required to identify all amino acid sequences of at least 4 L-amino acids and at least 10 nucleotides by a sequence identifier, i.e., "SEQ ID NO:". It is noted that applicant filed a CFR and Sequence listing on October 8, 2004 , however the sequence erred which is outlined on the error report. If these sequences have not been disclosed in the computer readable form of the sequence listing and the paper

copy thereof, applicant must provide a computer readable form of the "Sequence Listing" including these sequences, a paper copy of the "Sequence Listing", as well as an amendment directing its entry into the specification, and a statement that the content of the paper and computer readable form copies are the same and, where applicable, include no new matter as required by 37 CFR 1.821(e) or 1.821(f) or 1.821(g) or 1.821(b) or 1.825(d). See the attached Notice to Comply with the sequence rules and error report.

Claim Objection

5. Claims 41, 48 and 54-55 are objected to because of the following informalities:

For clarity and precision of claim language it is suggested that the phrase "identical host cell" is deleted from the claim and instead replaced with "the parent *Bacillus licheniformis* host cell", because it is unclear what constitutes "identical", if it is based on function, sequence or some other parameter.

For clarity and precision of claim language it is suggested that claim 48 is amended to read "The host cell of claim 43, wherein the heterologous gene(s) are in an operon".

For clarity and precision of claim language it is suggested that claim 54 is amended to read, "The host cell of claim 53, wherein the enzymes are selected from the group consisting of oxidoreductases (EC1), transferases (EC2)....".

For clarity it is suggested that claim 55 is amended to read, "The host cell of claim 53, wherein the enzymes have an activity selected from the group consisting of aminopeptidase..."

Correction is required.

Claim Rejections - 35 USC 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claim 41-62 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method of making proteins in a host cell, does not enable a method to produce any products or the genus of heterologous proteins/genes encompassed in the claims. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The enablement requirement refers to the requirement that the specification describe how to make and how to use the invention. There are many factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does

not satisfy the enablement requirement and whether any necessary experimentation is undue. These factors include, but are not limited to: Quantity of Experimentation Necessary; Amount of direction or guidance presented; Presence or absence of working examples; Nature of the Invention; State of the prior art and Relative skill of those in the art; Predictability or unpredictability of the art and Breadth of the claims (see *In re Wands, 858 F.2d at 737, 8 USPQ2d at1404 (Fed. Cir. 1988)*. The factors most relevant to the instant invention are discussed below.

In re Fisher, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970) states that, "The amount of guidance or direction needed to enable the invention is inversely related to the amount of knowledge in the state of the art as well as the predictability in the art". "The amount of guidance or direction" refers to that information in the application, as originally filed, that teaches exactly how to make or use the invention. The more that is known in the prior art about the nature of the invention, how to make, and how to use the invention, and the more predictable the art is, the less information needs to be explicitly stated in the specification. In contrast, if little is known in the prior art about the nature of the invention and the art is unpredictable, the specification would need more detail as to how to make and use the invention in order to be enabling" (MPEP 2164.03). The MPEP further states that physiological activity can be considered inherently unpredictable. Thus, applicant assumes a certain burden in establishing that inventions involving physiological activity are enabled.

The claimed invention is directed to a " A *Bacillus licheniformis* mutant host cell, said mutant host cell is derived from a parent *Bacillus licheniformis* which mutant host

cell comprises a mutation in a gene encoding a polypeptide involved in antibiotic synthesis, wherein said gene is native to said host cell, and wherein said gene encodes a polypeptide which is at least 95% identical to the polypeptide of SEQ ID NO:2", however, the instant specification does not provide support for the claims as they are broadly drawn and encompass an unspecified amount of heterologous genes and polypeptides. In addition, the claims broadly read on any polypeptide involved in antibiotic synthesis and the instant specification does not clearly define "how involved".

The quantity of experimentation necessary would be undue as the claims encompass an unspecified amount of heterologous genes and proteins. Furthermore, no reasonable correlation is made between function and structure. Additionally, the claims recite that genes are either partially or completely deleted to produce the claimed mutant host cell, however, there is no indication of what genes. . For instance the art demonstrated via precise deletions in tagB, tagF and tarD, a disturbance in the teichoic acids found in the wall of the gram-positive bacteria *Bacillus subtilis* based on gene deletions (see, Bhavsar et al., Journal of Bacteriology, December 2004, vol. 186, no. 23, pages 7865-7873). As the art supports the unpredictability of structural modifications, a correlation between structure and function is critical in view of the mutations contemplated in the instant application in a similar organism to a greater extent. Further the claims recite the open language of "comprising" thus there is no limit on how many genes can be completely deleted, no limit on the percentage of how much polypeptides are expressed in a lesser amount based on said mutation, no limit on the number of heterologous genes or polypeptides. Moreover the claims to the recited

process are unlimited with respect to what "product of interest" is used. It is noted that the instant specification discloses a protein product, however, the claims read on any product, which is not supported by the disclosure. The issue in this case is the breath of the claims in light of the predictability of the art as determined by the number of working examples, the skill level artisan and the guidance presented in the instant specification and the prior art of record. Therefore, for all these reasons the claimed invention is not enabled and specification is not commensurate in scope with the claims.

7. Claims 41-62 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claimed invention is directed to a " A *Bacillus licheniformis* mutant host cell, said mutant host cell is derived from a parent *Bacillus licheniformis* which mutant host cell comprises a mutation in a gene encoding a polypeptide involved in antibiotic synthesis, wherein said gene is native to said host cell, and wherein said gene encodes a polypeptide which is at least 95% identical to the polypeptide of SEQ ID NO:2", however, the instant specification does not provide adequate written description because the claims encompass an unspecified amount of heterologous genes and polypeptides. In addition, the claims broadly read on any polypeptide involved in antibiotic synthesis and the instant specification does not clearly define "how involved". The specification provides no information on the function of a polypeptide whose

sequence is disclosed in SEQ ID NO:2, other than the involvement in antibiotic synthesis, or any particular region or amino acids thereof which have any significance to this function of the polypeptide or identified any conserved regions/domains. The disclosure is not deemed to be descriptive of the complete structure of a representative number of species encompassed by the claims as one skilled in the art cannot envision all the mutant host cells having mutations in genes encoding polypeptides which are involved in "antibiotic synthesis", for example. The specification provides no information regarding the precise amino acids, or even which general regions of the polypeptide whose sequence is shown in SEQ ID NO:2, can be altered, and remain involved in antibiotic synthesis. There is no structure-function analysis of the disclosed polypeptide shown in SEQ ID NO:2 that could be modified and retain function in antibiotic synthesis. Thus, the claimed invention is directed to a large variable genus, for which the specification fails to provide any additional representative species of the claimed genus, to show that applicant was in possession of the claimed genus.

A representative number of species means that the species, which are adequately described are representative of the entire genus. The written description requirement for a claimed genus may be satisfied through sufficient description of a representative number of species by actual reduction to practice, disclosure of drawings, or by disclosure of relevant identifying characteristics, for example, structure or other physical and/or chemical properties, by functional characteristics coupled with a known or disclosed correlation between function and structure, or by a combination of

such identifying characteristics, sufficient to show the applicant was in possession of the claimed genus.

Further, *Vas-Cath Inc. v. Mahurkar, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir.1991)*, states that "applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in *possession of the invention*. The invention is, for purposes of the 'written description' inquiry, *whatever is now claimed*" (See page 1117). The specification does not "clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed" (See *Vas-Cath* at page 1116). The skilled artisan cannot envision the detailed chemical structure of the encompassed genus of polypeptides, and therefore, conception is not achieved until reduction to practice has occurred, regardless of the complexity or simplicity of the method of isolation. Adequate written description requires more than a mere statement that it is part of the invention and reference to a potential method of isolating it. The compound itself is required. *See Fiers v. Revel, 25 USPQ2d 1601 at 1606 (CAFC 1993).*

Therefore, for all these reasons the specification lacks adequate written description, and one of skill in the art cannot reasonably conclude that the applicant had possession of the claimed invention at the time the instant application was filed.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

8. Claims 41-62 are rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter, which applicant (s) regard as their invention.

Claim 41 is confusing, the claim recites " A *Bacillus licheniformis* mutant host cell, said mutant host cell is derived from a parent *Bacillus licheniformis* which mutant host cell comprises a mutation in a gene encoding a polypeptide involved in antibiotic synthesis, wherein said gene is native to said host cell, and wherein said gene encodes a polypeptide which is at least 95% identical to the polypeptide of SEQ ID NO:2", because the claim recites "a gene that encodes a polypeptide involved in antibiotic synthesis" and also recites "said gene encodes a polypeptide which is at least 95% identical to SEQ ID NO:2" and it is unclear whether the polypeptide with the activity is the same as the polypeptide that has 95% identity to SEQ ID NO:2. Thus it is also unclear which of the recited polypeptides yields 5% less expression. Further the claim is unclear as to how the gene is mutated to produce said "mutated host cell". It is noted that claim 42 recites that said mutation occurs via deletion of a gene, however, independent claim 41 has to stand on its own. The dependent claims hereto are also included in this rejection.

Claim 42 is indefinite for the recitation of "a partial or complete deletion of said gene in claim 41", because how can a completely deleted gene express a polypeptide. Moreover, the instant specification discloses that the mutation is as a result of "...a partial or complete deletion of the one or more gene(s) encoding the one or more polypeptide(s) involved in antibiotic synthesis (see paragraph [0019]). Thus, it appears that several genes and polypeptides are involved in the antibiotic synthesis, which is only reflected in claim 43. Further, see also claim 59 for similar language.

Claim 50 is indefinite for the recitation of "an intermediate of interest", because it is unclear what constitutes an intermediate of interest, and no definition is provided in the specification.

Response to Arguments

9. The response filed has been considered. The rejections of record have been withdrawn based on applicant's amendments to the claims. Note that the rejections instituted under 35 U.S.C. 112, first paragraph are for different reasoning that previously of record, thus applicant's arguments are moot. The rejections herein are in place for the reasons stated above.

Conclusion

10. No claims are presently allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hope A. Robinson whose telephone number is 571-272-0957. The examiner can normally be reached on Monday-Friday.
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapu Achutamurthy, can be reached at (571) 272-0928. The fax

phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Hope Robinson, MS
Primary Examiner 9/21/07

HOPE ROBINSON
PRIMARY EXAMINER

Application No.: 10/510,941

NOTICE TO COMPLY WITH REQUIREMENTS FOR PATENT APPLICATIONS CONTAINING NUCLEOTIDE SEQUENCE AND/OR AMINO ACID SEQUENCE DISCLOSURES

Applicant must file the items indicated below within the time period set the Office action to which the Notice is attached to avoid abandonment under 35 U.S.C. § 133 (extensions of time may be obtained under the provisions of 37 CFR 1.136(a)).

The nucleotide and/or amino acid sequence disclosure contained in this application does not comply with the requirements for such a disclosure as set forth in 37 C.F.R. 1.821 - 1.825 for the following reason(s):

- [x] 1. This application clearly fails to comply with the requirements of 37 C.F.R. 1.821-1.825. Applicant's attention is directed to the final rulemaking notice published at 55 FR 18230 (May 1, 1990), and 1114 OG 29 (May 15, 1990). If the effective filing date is on or after July 1, 1998, see the final rulemaking notice published at 63 FR 29620 (June 1, 1998) and 1211 OG 82 (June 23, 1998).
- [ ] 2. This application does not contain, as a separate part of the disclosure on paper copy, a "Sequence Listing" as required by 37 C.F.R. 1.821(c).
- [ ] 3. A copy of the "Sequence Listing" in computer readable form has not been submitted as required by 37 C.F.R. 1.821(e).
- [x] 4. A copy of the "Sequence Listing" in computer readable form has been submitted. However, the content of the computer readable form does not comply with the requirements of 37 C.F.R. 1.822 and/or 1.823, as indicated on the attached copy of the marked -up "Raw Sequence Listing."
- [ ] 5. The computer readable form that has been filed with this application has been found to be damaged and/or unreadable as indicated on the attached CRF Diskette Problem Report. A Substitute computer readable form must be submitted as required by 37 C.F.R. 1.825(d).
- [ ] 6. The paper copy of the "Sequence Listing" is not the same as the computer readable form of the "Sequence Listing" as required by 37 C.F.R. 1.821(e).
- [x] 7. Other: See Raw Sequence Listing Error Report

8. **Applicant Must Provide:**

- [x] An initial or substitute computer readable form (CRF) copy of the "Sequence Listing".
- [x] An initial or substitute paper copy of the "Sequence Listing", as well as an amendment directing its entry into the specification.
- [x] A statement that the content of the paper and computer readable copies are the same and, where applicable, include no new matter, as required by 37 C.F.R. 1.821(e) or 1.821(f) or 1.821(g).

For questions regarding compliance to these requirements, please contact:

- For Rules Interpretation, call (703) 308-4216 or (703) 308-2923
- For CRF Submission Help, call (703) 308-4212
- For PatentIn software Program Support:
  - HELP DESK: (703) 739-8559, ext 508, M-F, 8 AM to 5 PM EST except holidays
  - Email: PATIN21HELP@uspto.gov
  - To purchase PatentIn sofftware: (703) 306-2600

PLEASE RETURN A COPY OF THIS NOTICE WITH YOUR RESPONSE

Notice to Comply

08 OCT 2004

CRF Errors Edited by the STIC Systems Branch

Serial Number: 10/510,941 : CRF Edit Date: 10-22-04
Edited by: KL

___ Realigned nucleic acid/amino acid numbers/text in cases where the sequence text "wrapped" to the next line

___ Corrected the SEQ ID NO. Sequence numbers edited were:

_____

___ Inserted or corrected a nucleic number at the end of a nucleic line. SEQ ID NO's edited:

_____

✓ Deleted: ✓ invalid beginning/end-of-file text ; ___ page numbers

___ Inserted mandatory headings/numeric identifiers, specifically:

_____

___ Moved responses to same line as heading/numeric identifier, specifically:

_____

___ Other:

_____
_____
_____

Revised 09/09/2003

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PATENT APPLICATION: US/10/510,941 TIME: 09:18:29

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  5       Andersen, Jens Tonne
  6       Olesen, Peter Bjarke
  7       Clausen, Ib Groth
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C--> 13 <141> CURRENT FILING DATE: 2004-10-08
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Lys	Lys	Ile	Ile	Glu	Gly	Leu	Ser	Phe	Asp	Val	Arg	Ala	Gly	Glu	Ile
			20					25					30		
Phe	Gly	Phe	Leu	Gly	Pro	Asn	Gly	Ala	Gly	Lys	Thr	Thr	Thr	Ile	Arg
		35					40					45			
Met	Ile	Val	Gly	His	Met	Ser	Ile	Thr	Ala	Gly	Glu	Ile	Ala	Val	Cys
	50					55					60				
Gly	Val	Ser	Val	Lys	Glu	Asn	Phe	Glu	Lys	Ala	Ala	Arg	His	Ile	Gly
65					70					75					80
Ala	Ile	Val	Glu	Asn	Pro	Glu	Leu	Tyr	Lys	Phe	Leu	Thr	Gly	Tyr	Gln
				85					90					95	
Asn	Leu	Gln	Gln	Tyr	Ala	Arg	Met	Thr	Lys	Gly	Val	Thr	Lys	Lys	Lys
			100					105					110		
Ile	Asp	Glu	Ile	Val	Glu	Leu	Val	Gly	Leu	Lys	Asn	Arg	Ile	Asn	Asp
		115					120					125			
Lys	Val	Lys	Thr	Tyr	Ser	Leu	Gly	Met	Arg	Gln	Arg	Leu	Gly	Leu	Ala
	130					135					140				
Gln	Ser	Leu	Leu	His	Asp	Pro	Lys	Leu	Leu	Ile	Leu	Asp	Glu	Pro	Thr
145					150					155					160
Asn	Gly	Leu	Asp	Pro	Ala	Gly	Ile	Arg	Glu	Ile	Arg	Asp	Tyr	Leu	Arg
				165					170					175	
Lys	Leu	Thr	Arg	Glu	Lys	Gly	Met	Ala	Val	Ile	Val	Ser	Ser	His	Leu
			180					185					190		
Leu	Ser	Glu	Met	Glu	Leu	Met	Cys	Asp	Arg	Ile	Ala	Ile	Ile	Gln	Asn
		195					200					205			
Gly	Lys	Leu	Arg	Asp	Ile	Gln	His	Val	His	Gly	Pro	Ala	Arg	Asp	Glu
	210					215					220				
Lys	Lys	Arg	Tyr	Tyr	Ile	Gln	Ala	Asp	Asp	Thr	Gln	Ala	Leu	Thr	Arg
225					230					235					240
Glu	Ala	Ala	Ala	Phe	Arg	Lys	Val	Lys	Val	Asp	Glu	Ala	Glu	Gly	Gly
				245					250					255	
Ile	Glu	Leu	Ser	Ile	Gln	Lys	Asp	Glu	Val	Pro	Asp	Leu	Ile	Lys	His
			260					265					270		
Leu	Thr	Asp	Ser	Gly	Val	Arg	Leu	Tyr	Glu	Val	Lys	Ala	Val	Asn	Lys
		275					280					285			
Ser	Leu	Glu	Asp	Arg	Phe	Leu	Glu	Ile	Thr	Ala	Asp	Lys	Glu	Glu	Ala
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Gln	His	Val													
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<210> SEQ ID NO: 3
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<212> TYPE: DNA
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<220> FEATURE:
<221> NAME/KEY: CDS

RAW SEQUENCE LISTING DATE: 10/22/2004
PATENT APPLICATION: US/10/510,941 TIME: 09:18:29

Input Set : A:\pto.kd.txt
Output Set: N:\CRF4\10222004\J510941.raw

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233 atgctggacg gagtcgctga tgtcatcgtc acagacggct ttaccggtaa cgttgccttg    180
235 aaaacggtcg agggcgcggc gctgtccatt tttaaaatgc tgagaacgac gctgacttcg    240
237 agcttcacgg cgaagctcgc cgcttctgca ctgaagccga agctgaaaga aatgaaaacg    300
239 aaaatggatt actctgaata cggcggagcc ggattgttcg gcttaaaggc gcccgtcatc    360
241 aaagcgcacg gatcatctga cggacgcgcc gtttatcacg cgatccgcca ggccagagag    420
243 atggtcagcc aaaatgtcgc ggcatttatc gaagaaaaaa ttcaacaaaa agcagatgaa    480
245 tagtctggag gttttaacac atg ggc aag att gct ttt cta ttc ccg ggc caa    533
246                         Met Gly Lys Ile Ala Phe Leu Phe Pro Gly Gln
247                         1               5                  10
249 ggt tcg cag cat atc ggc atg gga cac gaa ttg tat gaa aaa gaa ccg      581
250 Gly Ser Gln His Ile Gly Met Gly His Glu Leu Tyr Glu Lys Glu Pro
251             15                  20                  25
253 aat gcg aag aag att ttt gaa gaa gcg gat caa acg ctt gaa aca aaa      629
254 Asn Ala Lys Lys Ile Phe Glu Glu Ala Asp Gln Thr Leu Glu Thr Lys
255         30                  35                  40
257 ctg agc acc ctc atg ttt gaa ggg gat gca aag gaa ctg acg ctt aca      677
258 Leu Ser Thr Leu Met Phe Glu Gly Asp Ala Lys Glu Leu Thr Leu Thr
259     45                  50                  55
261 tac aac gcg cag cca agc ctt tta acg gcg agc atc gca gcg ctt gaa      725
262 Tyr Asn Ala Gln Pro Ser Leu Leu Thr Ala Ser Ile Ala Ala Leu Glu
263 60                  65                  70                  75
265 aaa ctg aag gaa tac ggc att aaa gcc gac tat gcg gca ggt cac agc      773
266 Lys Leu Lys Glu Tyr Gly Ile Lys Ala Asp Tyr Ala Ala Gly His Ser
267                 80                  85                  90
269 ctc ggc gaa tac agc gca ttg gtc gct gcc ggc gcc ttg tcg ttt aaa      821
270 Leu Gly Glu Tyr Ser Ala Leu Val Ala Ala Gly Ala Leu Ser Phe Lys
271             95                  100                 105
273 gat gcg gtt tat gcc gtc aga aag cgc ggc gaa ttc atg aat gaa gcc      869
274 Asp Ala Val Tyr Ala Val Arg Lys Arg Gly Glu Phe Met Asn Glu Ala
275         110                 115                 120
277 gtg ccg gcg gga gaa ggc gcg atg gcg gcc att ctc ggc atg gac agc      917
278 Val Pro Ala Gly Glu Gly Ala Met Ala Ala Ile Leu Gly Met Asp Ser
279     125                 130                 135
281 cag gcg ctg aaa gaa gtg acg gac aaa att tcc gaa gaa gga aac ctt      965
282 Gln Ala Leu Lys Glu Val Thr Asp Lys Ile Ser Glu Glu Gly Asn Leu
283 140                 145                 150                 155
285 gtt cag ctc gcc aat ttg aac tgc cct ggg caa atc gtc atc tcg gga     1013
286 Val Gln Leu Ala Asn Leu Asn Cys Pro Gly Gln Ile Val Ile Ser Gly
287                 160                 165                 170
289 aca gct aaa ggc gtg gag ctc gct tca gag ctt gcg aaa gaa aag ggc     1061
290 Thr Ala Lys Gly Val Glu Leu Ala Ser Glu Leu Ala Lys Glu Lys Gly
291             175                 180                 185
293 gca aaa cgc gcg att cct ctc gaa gtc agc ggg ccg ttc cat tct gag     1109
294 Ala Lys Arg Ala Ile Pro Leu Glu Val Ser Gly Pro Phe His Ser Glu
295         190                 195                 200
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297 ctg atg aag ccg gca gct gat aag ctt cgt gaa gtt ctt gat gcg tgc     1157
298 Leu Met Lys Pro Ala Ala Asp Lys Leu Arg Glu Val Leu Asp Ala Cys
299     205                 210                 215
301 acg atc aac gac gca gcc att ccg gtc gtc tcc aac gta acg gcc gac     1205
302 Thr Ile Asn Asp Ala Ala Ile Pro Val Val Ser Asn Val Thr Ala Asp
303 220                 225                 230                 235
305 ttt gta acg gat aaa gac gac att aag aat aaa ctg att gaa cag ctg     1253
306 Phe Val Thr Asp Lys Asp Asp Ile Lys Asn Lys Leu Ile Glu Gln Leu
307                 240                 245                 250
309 tat tcc cct gta cgc ttt gaa gaa aca atc agc cgc ctg att gac gaa     1301
310 Tyr Ser Pro Val Arg Phe Glu Glu Thr Ile Ser Arg Leu Ile Asp Glu
311             255                 260                 265
313 ggc gtc acg acc ttc att gaa atc ggt ccc gga aag gtt ttg tca ggg     1349
314 Gly Val Thr Thr Phe Ile Glu Ile Gly Pro Gly Lys Val Leu Ser Gly
315         270                 275                 280
317 ctt gtg aag aaa gtg aac cgc aga gtc aaa acg att gct gta tca gac     1397
318 Leu Val Lys Lys Val Asn Arg Arg Val Lys Thr Ile Ala Val Ser Asp
319     285                 290                 295
321 ccg aac aca att gaa ctt gcc gtt caa acg ttg aag gag gaa aac gaa     1445
322 Pro Asn Thr Ile Glu Leu Ala Val Gln Thr Leu Lys Glu Glu Asn Glu
323 300                 305                 310                 315
325 aat gct gga aaa taaaacagcc gttgtgacag gagcctcaag aggaatcggc         1497
326 Asn Ala Gly Lys
329 cgcgcgatcg ccctggacct ggcgaaaaac ggagcaaatg tcgtcgtcaa ctacgcggga   1557
331 aatgaagcga aagcgaacga agtcgtagac gaaatcaaag cgctcggccg cgatgcgttt   1617
333 gcttttaaag cggacgtttc caatgcggat gaggttcagg cgatgatgaa ggaagcggtc   1677
335 ggacgcttcg gcacgcttga catccttgtc aacaatgcgg gcattactaa agacaatctg   1737
337 ttcatgagaa tgaaagaaga tgaatgggac gacgtcatta acataaactt aaaaggtgtg   1797
339 ttcaattgtt caaaagctgt gacaagacag atgatgaaac aaagaagcgg ccggatcatc   1857
341 aatatcacct cggttgtagg cgtcgtcggt aacgccgggc aggccaacta tgtcgcggct   1917
343 aaatcaggcg tattccagta g                                           1938
346 <210> SEQ ID NO: 4
347 <211> LENGTH: 319
348 <212> TYPE: PRT
349 <213> ORGANISM: Bacillus licheniformis
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357 Gly Met Gly His Glu Leu Tyr Glu Lys Glu Pro Asn Ala Lys Lys Ile
358             20                  25                  30
361 Phe Glu Glu Ala Asp Gln Thr Leu Glu Thr Lys Leu Ser Thr Leu Met
362         35                  40                  45
365 Phe Glu Gly Asp Ala Lys Glu Leu Thr Leu Thr Tyr Asn Ala Gln Pro
366     50                  55                  60
369 Ser Leu Leu Thr Ala Ser Ile Ala Ala Leu Glu Lys Leu Lys Glu Tyr
370 65                  70                  75                  80
373 Gly Ile Lys Ala Asp Tyr Ala Ala Gly His Ser Leu Gly Glu Tyr Ser
374                 85                  90                  95
377 Ala Leu Val Ala Ala Gly Ala Leu Ser Phe Lys Asp Ala Val Tyr Ala
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VERIFICATION SUMMARY DATE: 10/22/2004
PATENT APPLICATION: US/10/510,941 TIME: 09:18:30

Input Set : A:\pto.kd.txt
Output Set: N:\CRF4\10222004\J510941.raw

L:13 M:270 C: Current Application Number differs, Replaced Current Application No
L:13 M:271 C: Current Filing Date differs, Replaced Current Filing Date